URINARY INCONTINENCE

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Definition

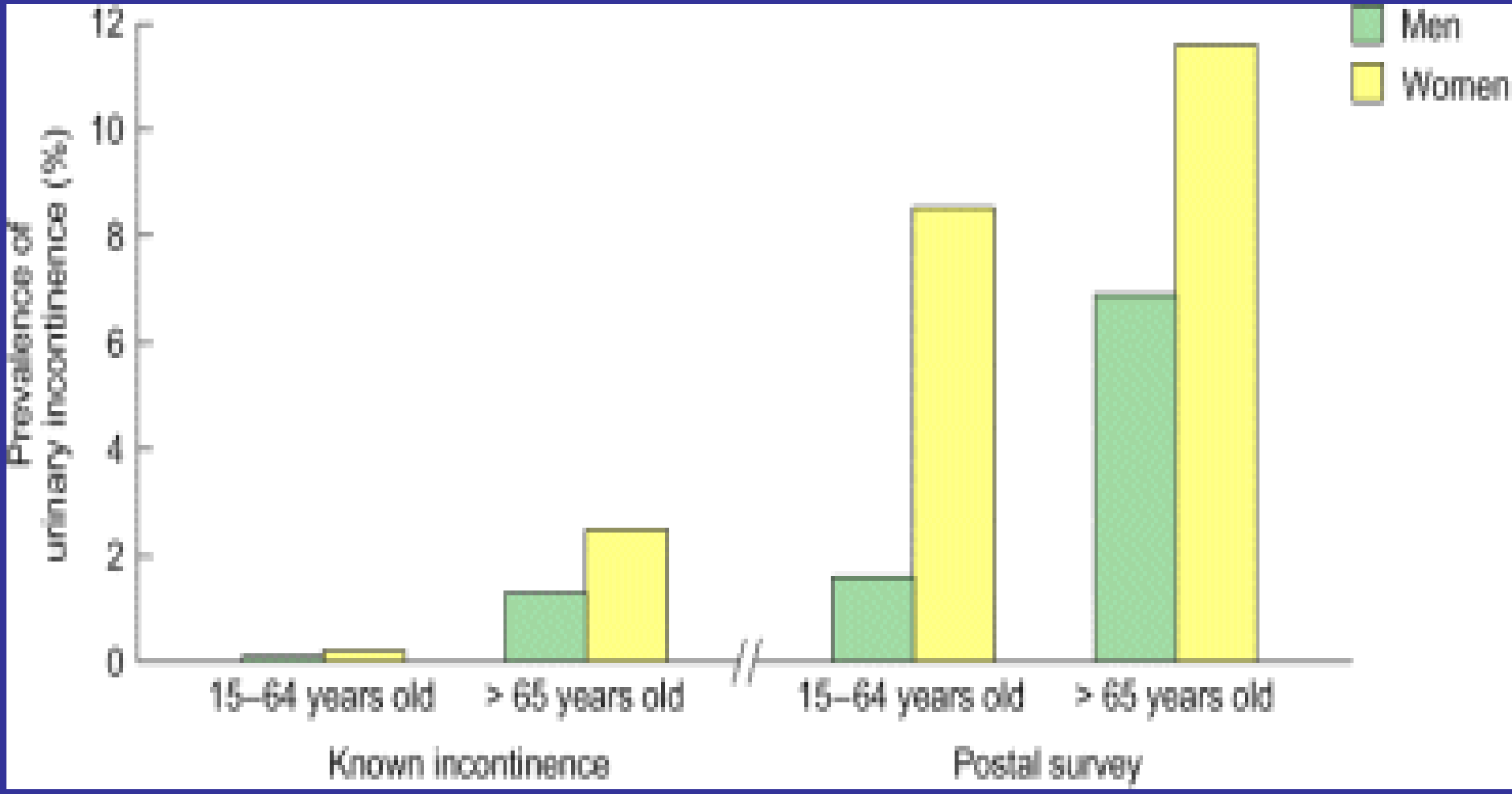
- “Incontinence” derived from Latin as *lacking sexual restraint or being unchaste*

- “The involuntary loss of urine which is sufficient to be a problem” *Agency for Health Care Policy and Research (AHCPR)*

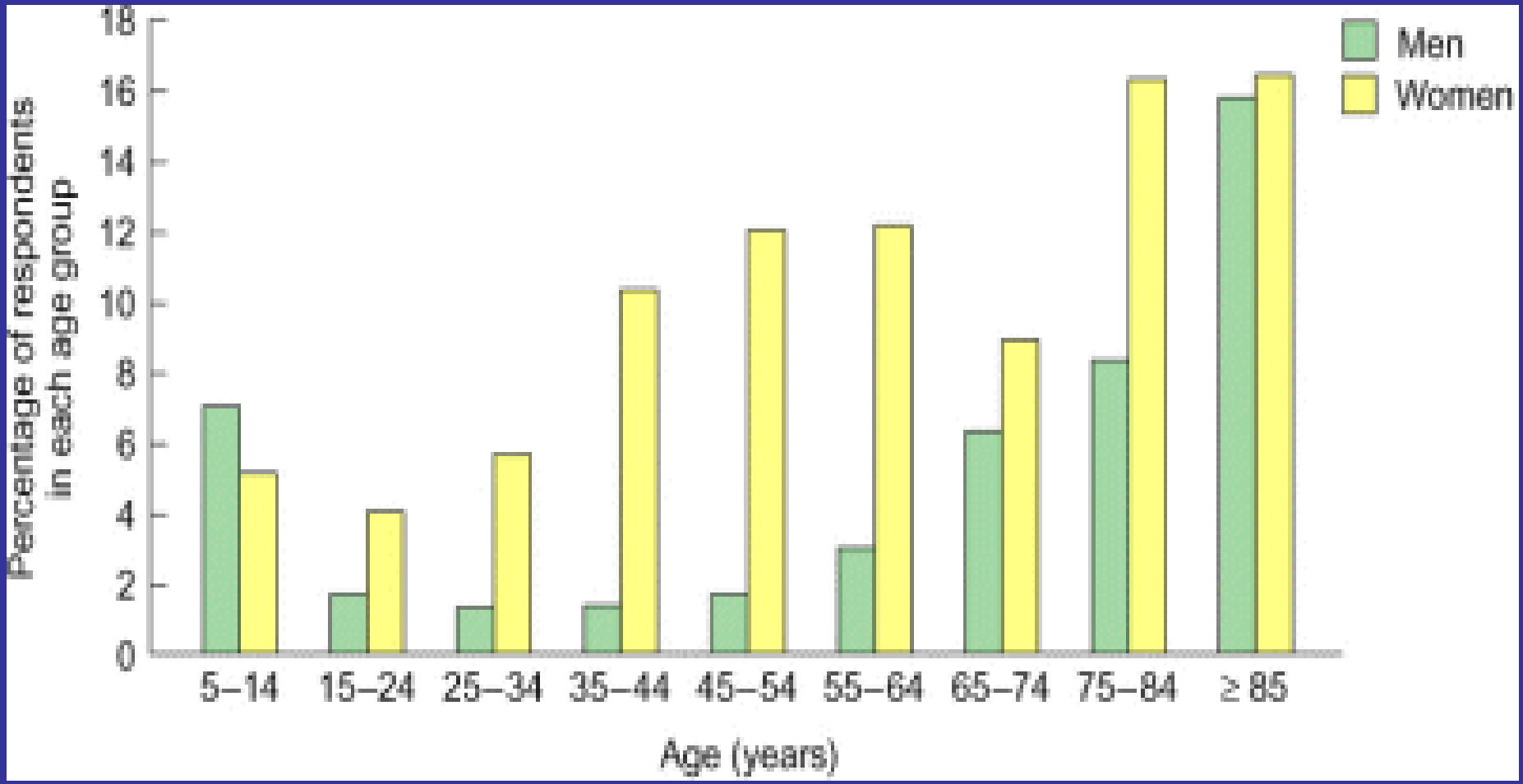
Magnitude of Problem

- 13 million Americans affected
- 1/2 of those in nursing homes
- 1/3 of patients in acute care settings
- 15 - 30% prevalence in older community-dwelling adults
- Females > males
  - 1 in 4 will be affected
  - older patients 2 : 1 (>65 years)
  - younger patients 5 : 1

Prevalence


Men
Women
Prevalence of urinary incontinence (%)
0
2
4
6
8
10
12
15–64 years old
> 65 years old
15–64 years old
> 65 years old
Known incontinence
Postal survey

Prevalence


Men
Women
Percentage of respondents in each age group
0
2
4
6
8
10
12
14
16
18
5–14
15–24
25–34
35–44
45–54
55–64
65–74
75–84
≥ 85
Age (years)

Importance

- Embarrassment
- Stigmatization
- Isolation
- Depression
- Risk of institutionalization
- Caregiver burden and depression
- Social issues
- Psychological problems
- Occupational issues
- Domestic problems
- Physical problems
- Sexual problems

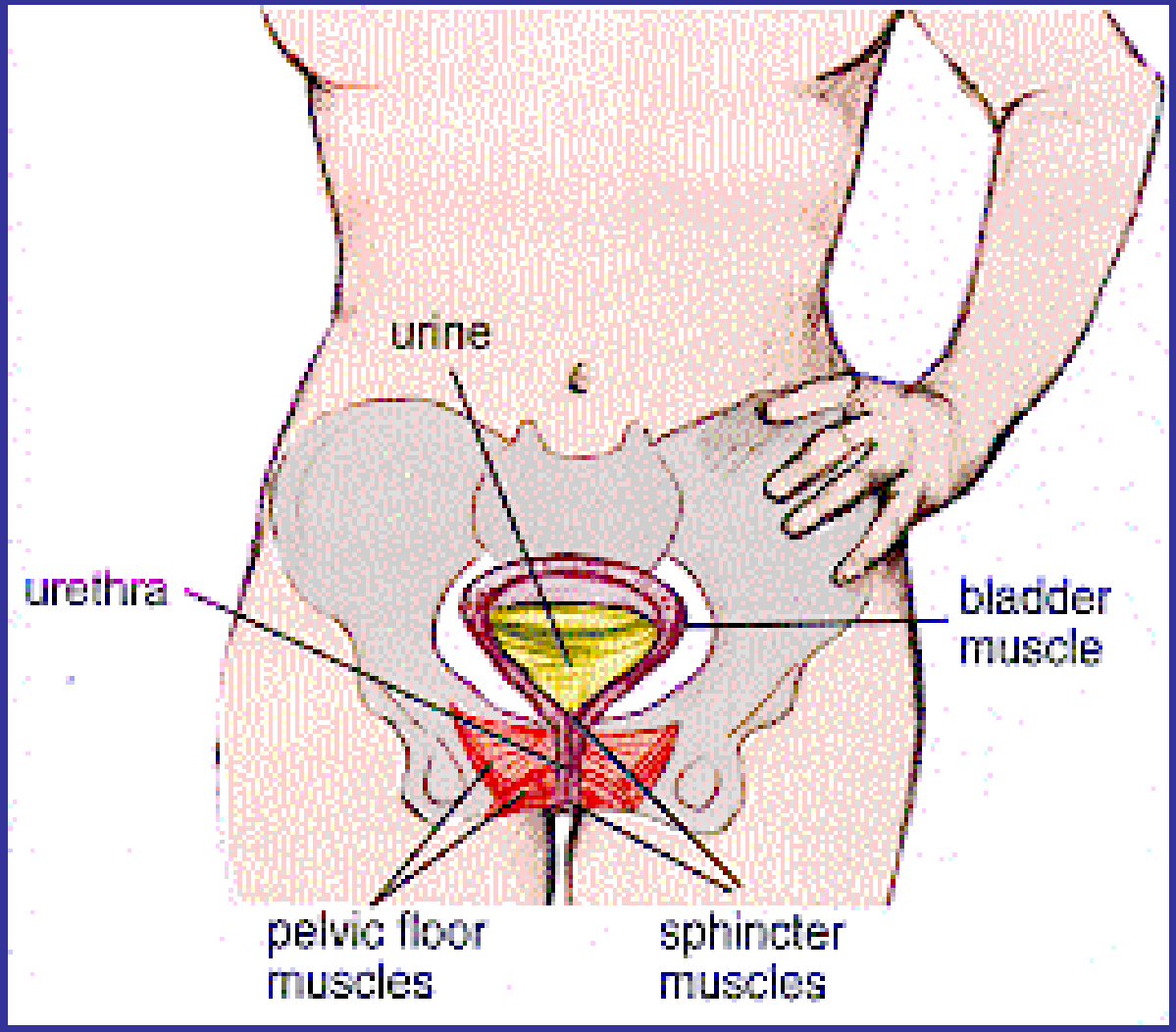
Economic Impact

- $16 billion/year is spent in U.S. (1994)
- $3,565 for each affected individual (1995)
- Exceeds $$ spent on CABG and dialysis ***combined!!***

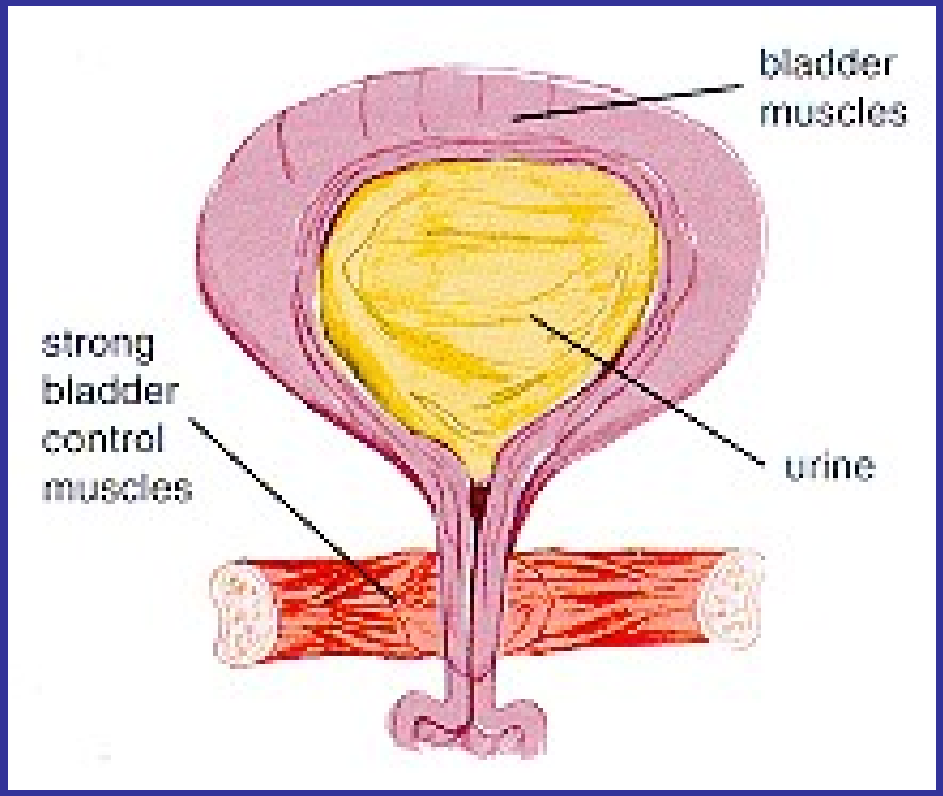
Health Hazard

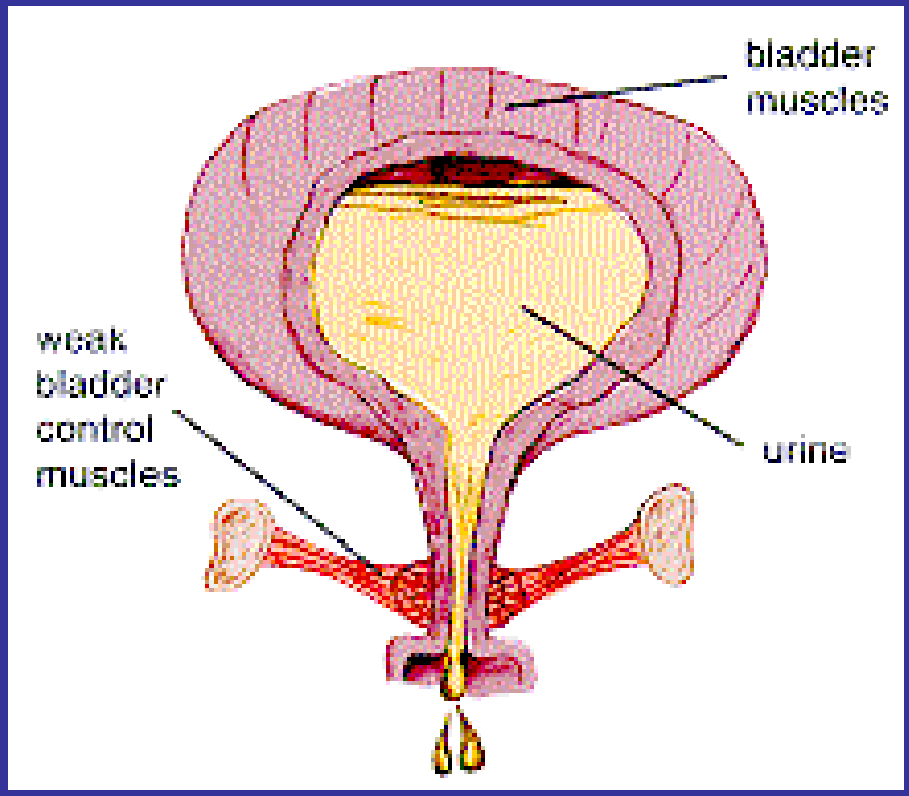
- #1 cause of nursing home admissions
- Predisposes to:
  - perineal rashes
  - pressure ulcers
  - secondary infections
  - UTIs
  - urosepsis
  - kidney problems
  - falls & fractures
  - urethral necrosis
  - volume depletion

Urinary System



Pelvic Floor





Micturition Reflex

- voluntary control
- rostral brain stem/pontine micturition center
- parasympathetic, somatic components of the sacral spinal cord
- sympathetic components of thoracolumbar spine

Neuroanatomy

Structure	System	Nerve
Bladder	Parasympathetic nervous system	Pelvic nerve
Internal sphincter	Sympathetic nervous system	Hypogastric nerve
External sphincter	Somatic nervous system	Pudendal nerve

Voiding

Micturition reflex

- striated sphincteric muscles relax
- detrusor pressure rises
- urethral pressure falls
- bladder and urethra become isobaric
- voiding ensues

What can go wrong will!

- Neurologic lesions
- Detrusor (bladder)
- Bladder neck (internal sphincter)
- External sphincter
- Transient causes of UI

Neurologic Abnormalities

Neurologic lesions above pons

- micturition reflex itself is normal
- voluntary control may be lost (can't prevent or initiate voiding)
- have urgency *without* incontinence
  - sense involuntary detrusor contraction
  - patient contracts striated sphincter to compensate

Neurologic Abnormalities

Neurologic lesions below pons

- detrusor-external sphincter dyssynergy
  - involuntary contractions of detrusor and striated uretheral sphincter muscles compete against each another
- weak detrusor contractions over time

Neurologic Abnormalities

- Parasympathetic lesions
  - areflexic bladder
  - urinary retention
  - gradual onset of low compliance
- Sympathetic lesions
  - proximal urethra loses sphincteric function
- Somatic lesions
  - lose voluntarily control of external urethral sphincter

Bladder Abnormalities

- Detrusor *overactivity* - involuntary detrusor contractions
  - Detrusor *instability* - not due to a neurologic condition
  - Detrusor *hyperreflexia* - resulting from a neurologic condition
- Detrusor *underactivity*
  - usually due to neurologic lesion
- Low bladder compliance

Sphincter Abnormalities

Urethral hypermobility

- *rotational descent* of vesicle neck and proximal urethra during increased abdominal pressure
- if urethra opens concomitantly = UI
- secondary to vaginal child birth, aging, neuropathy, lack of use of pelvic floor muscles, post prostate surgery (males)

Sphincter Abnormalities

Intrinsic sphincteric deficiency (ISD)

- lack of mucosal seal
- low Valsalva leak point pressure (LPP)
- due to:

  radiation therapy multiple UI surgeries

  radical hysterectomy hormone deprivation

  aging trauma

  neurologic conditions (Shy-Drager syndrome)

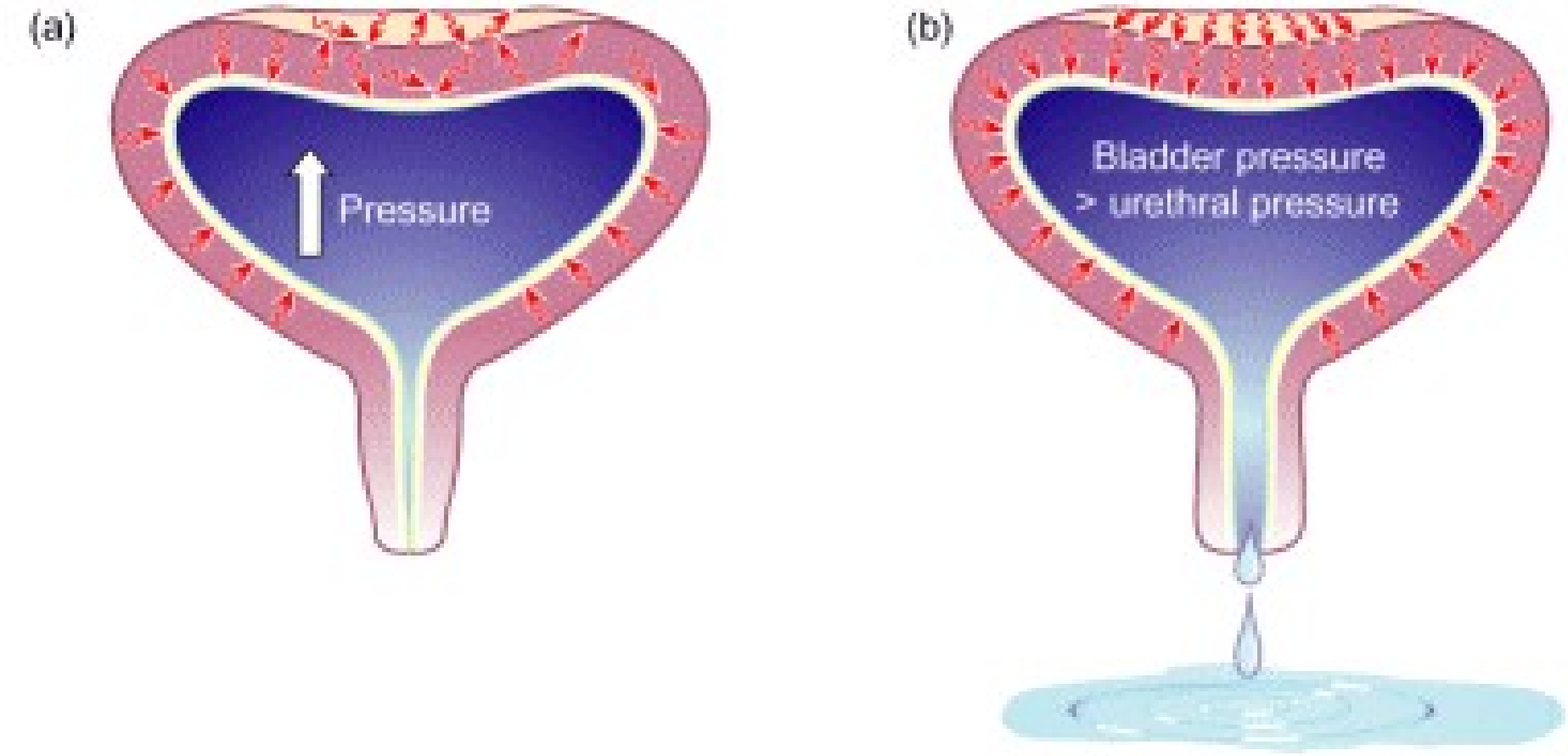
Simplified Definitions

- Urge
- Stress
- Mixed
- Reflex
- Overflow

Urge Incontinence

- *detrusor overactivity*
- strong desire to void
- sudden, unpreventable event
- lose *entire contents* of bladder
- *nocturia*, increased *frequency* present
- precipitating events include “key in door”, washing dishes, hearing water run, rising from seated position, entering a shower, and cold or rainy weather

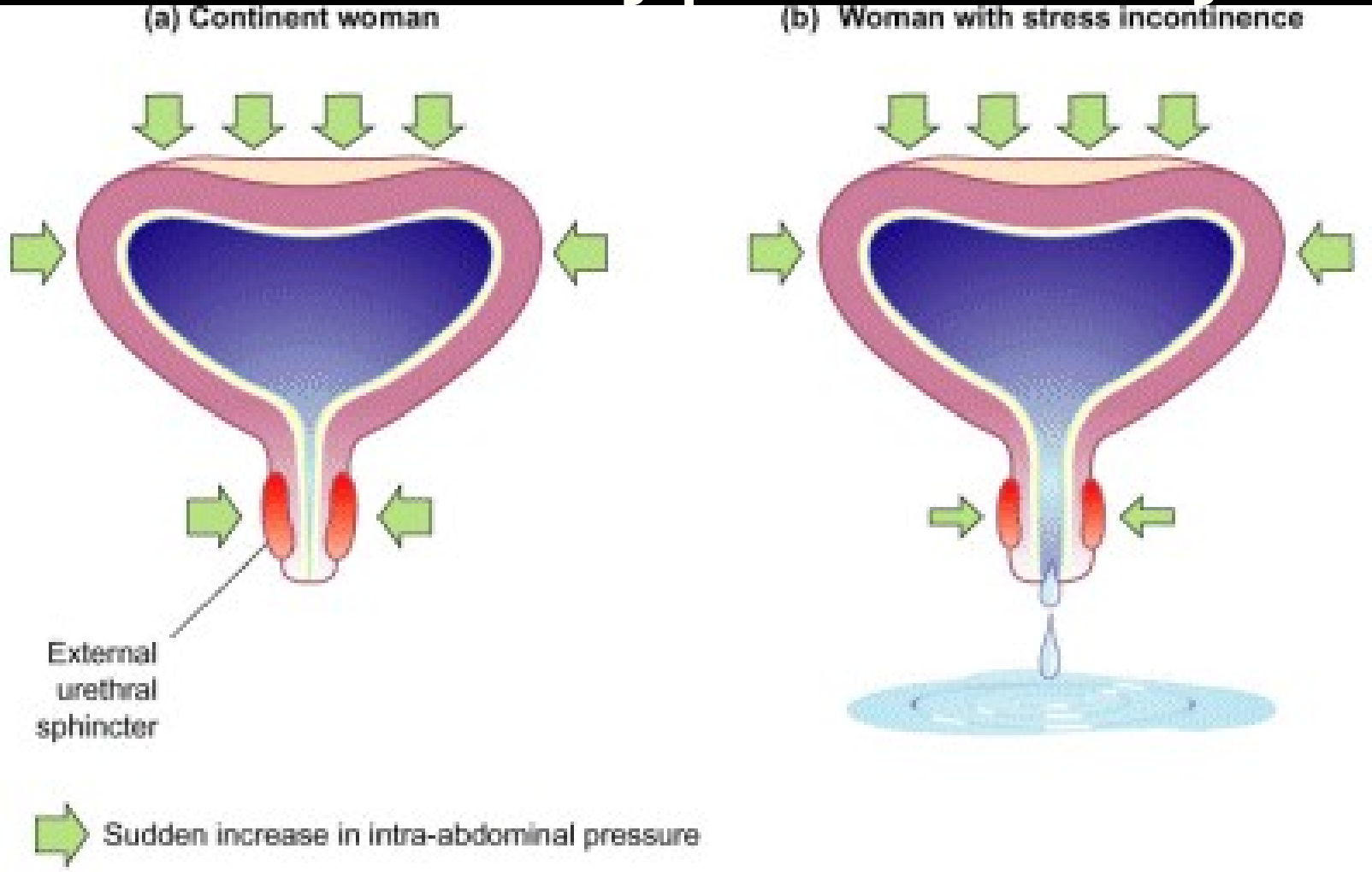
Detrusor Overactivity



Stress Incontinence

- *urethral hypermobility* or *ISD*
- urine amount lost *variable*
- **not** associated with nocturia or frequency
- bladder habits normal except loss of small predictable amount of urine with physical activity (coughing, straining, sports)

Urethral Hypermobility


(a) Continent woman
(b) Woman with stress incontinence
External urethral sphincter
Sudden increase in intra-abdominal pressure

Mixed Incontinence

- *detrusor overactive*
- *urethra underactive* (hypermobile or ISD)
- mild-moderate loss with activity and without warning
- therapy is directed to the most unbearable symptom first (and therapies for both differ)

Reflex Incontinence

- urge incontinence due to **neurologic** problems (*detrusor hyperactivty*)
- symptoms of *frequency, urgency,* and *nocturia* common
- etiologies:
  - Parkinson's disease
  - spinal cord injuries
  - stroke
  - brain tumor
  - multiple sclerosis

Overflow Incontinence

- bladder *overstretched*
  - due to *underactive detrusor* or *overactive urethra*
  - can’t hold more urine
  - can’t contract to void
  - must strain to get urine out
- with full bladder and stress maneuvers, urine may leak out - mimicking stress UI

Transient Causes of UI - “DIAPPERS”

- D - delirium
- I - infection (asymp. UTI does not cause UI)
- A - atrophic urethritis or vaginitis
- P - pharmaceuticals
- P - psychologic factors (depression, etc)
- E - endocrine disorders, excess urine output
- R - restricted mobility
- S - stool impaction

Medications Affecting Continence

- Alpha-adrenergic agonists (sympathomimetic decongestants)
- Alpha-adrenergic antagonists (prazosin, terazosin, phenoxybenzamine)
- Anticholinergics and agents with anticholinergic activity
- Antipsychotics/neuroleptics
- Bromocriptine
- Calcium-channel blockers
- Clonazepam
- Diuretics
- Ethanol
- Lithium
- Metoclopramide
- Misoprostol
- Phenytoin
- Sedatives/hypnotics
- Skeletal muscle relaxants (baclofen, dantrolene)
- Sympatholytics (methyldopa, reserpine, guanethedine)

Risk Factors

AGE

- Decrease in:
  - bladder contractility and capacity
  - ability to postpone voiding
  - maximum urinary flow rate
  - pelvic floor muscle strength
- Increase in:
  - involuntary detrusor contractions
  - PVR (50-100ml)
  - nocturia
  - incomplete emptying

Risk Factors

SEX

- Females
  - maximal urethral closure pressure declines
  - urethra length declines
  - vaginal deliveries and pelvic surgeries
- Males
  - prostatic enlargement
  - increase in detrusor instability

Office Evaluation

1. Magnitude of leakage
2. Events associated with leakage
3. PMH
4. Level of estrogenization
5. Voiding chart

Office Evaluation

PMH

- prostate
- diabetes
- glaucoma
- hypertension
- depression
- CHF
- prior UI treatment
- neurologic conditions

Medications

- α-adrenergic agonists/antagonists
- anti-cholinergics
- calcium channel blockers
- sedatives/hypnotics
- diuretics
- narcotics
- OTC medications

Office Evaluation

- UTI and prostatic symptoms
- alcohol, caffeine, overall fluid intake
- review pelvic/prostate surgeries
- functional assessment

*Determine most bothersome component

Physical Exam

- Abdomen
  - distention, suprapubic tenderness
- Pelvic-
  - parity, degree of estrogenization, prolapse
- Rectal exam
  - impaction, prostate
- Mobility
- Cognition

Physical Exam

- Neurologic exam
  - Sensory function
    - anal sphincter (S2-4)
  - Motor function
    - dorsiflexion (L4-S1)
    - plantar flexion (L5-S2)
    - toe extension (L5-S2)
  - Reflex integrity
    - bulbocavernosus (S2-4)
    - anal reflex (S2-5)
    - quadriceps (L3-4)
    - achilles (L5-S2)

Laboratory Evaluation

- BUN
- Creatinine
- UA
- Urine culture
- serum Na, Ca, Glu

Office Diagnostic Testing

- Voiding diary
- Marshall test, Q-tip test
- Stress testing
- PVR
  - <50 normal
  - >200 obstruction or underactive bladder
- Pad test

Voiding Diary

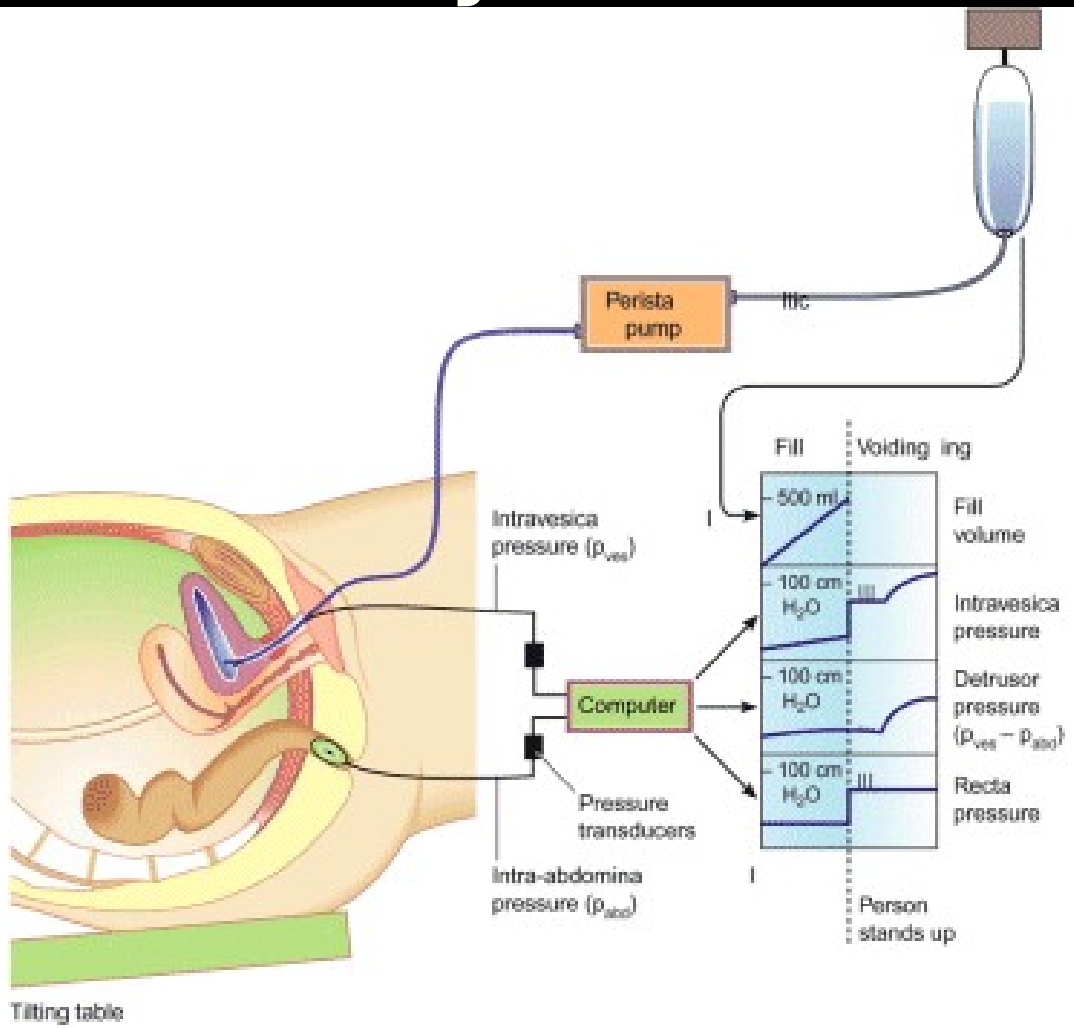
Date: *7th July 1997*

Time	Volume of urine produced (ml)	Did you get to the toilet in time?
6.30	500	Yes
10.05	250	Yes
12.00	100	Yes
15.55	300	Yes
18.05	150	Yes
22.30	250	Yes

Diagnostic Testing

- Urinary flow rate
- Cystourethroscopy
  - evaluate for urinary pathology
- Urodynamics
  - Eyeball urodynamics
  - Multichannel videourodynamics
    - Valsalva LPP
      - <60 cm=signif. ISD, >100=urethral hypermobility
  - Ambulatory urodynamics

Urodynamics



Treatment

- Behavioral
- Pharmacologic
- Periurethral injections
- Anti-incontinence devices
- Absorbent products
- Surgery
- Nerve stimulation

Behavioral Therapy

- First line therapy (AHCPR)
- Useful in stress, ISD, urge incontinence
- Useful in pts with mild symptoms and as adjunct for post-op patients

Behavioral Therapy

- Fluid and dietary modification
- Scheduled voiding regimens
  - deferred voiding training
  - timed voiding
- Pelvic floor re-education
  - pelvic muscle exercises
  - vaginal cones
  - biofeedback
  - electrical stimulation

Vaginal Cones

Pharmacologic Therapy

Urge Incontinence

1. Anticholinergics - reduce bladder overactivity
   - hysocyamine sulfate 0.375mg bid
     - reduces urge incontinence 0-53%
   - oxybutynin (ditropan) 2.5-5 mg tid-qid
     - reduction of up to 9-56%
   - tolterodine (detrol) 2mg bid (selective for bladder)
   - Precautions:
     - anticholinergic side effects
     - urinary retention (avoid if PVR >150)
     - can’t use in pts with wide angle glaucoma

Pharmacologic Therapy

Stress Incontinence

1. α-adrenergic agents (increase sphincter tone)
   - phenylpropanolamine SR 25-75mg bid
     - 0-60% reduction in symptoms
2. Estrogens (enhances trophicity)
   - useful in ISD
   - conjugated estrogens 0.3-1.25mg po or topically
   - synergy of estrogens with alpha-agonists

Pharmacologic Therapy

Mixed Incontinence

1. TCAs
   - increases bladder outlet resistance
   - inhibits bladder smooth muscle activity
   - Imipramine 25-100mg qhs
     - get 20-77% reduction in symptoms
   - may use in combo with anticholinergic
   - don't use in pts with cardiac dz-arrhythmias
2. Doluxetine (phase III trials)
   - inhibit uptake of serotonin and norepinephrine (increases bladder storage capacity)

Pharmacologic Therapy

Overflow Incontinence

Outlet Obstruction (BPH)

1. Alpha blockers
   - Terazosin (Hytrin) 10mg po qhs
2. 5 α-reductase inhibitor
   - Finasteride (Proscar) 5mg po qhs

Underactive Detrusor

1. Cholinergic Agonists
   - Bethanechol (Urecholine) 7.5-10mg po q4hrs

Pharmacologic Therapy

- ? Other proposed agents
  - Calcium channel blockers
    - useful if HTN, angina, diastolic dysfunction
  - Flavoxate (smooth muscle relaxant)
    - for bladder relaxant 100-200mg po tid-qid
  - Dicyclomine (Bentyl)
    - combo smooth muscle relaxant and anticholinergic
    - 10-30mg po tid

Periurethral Injections

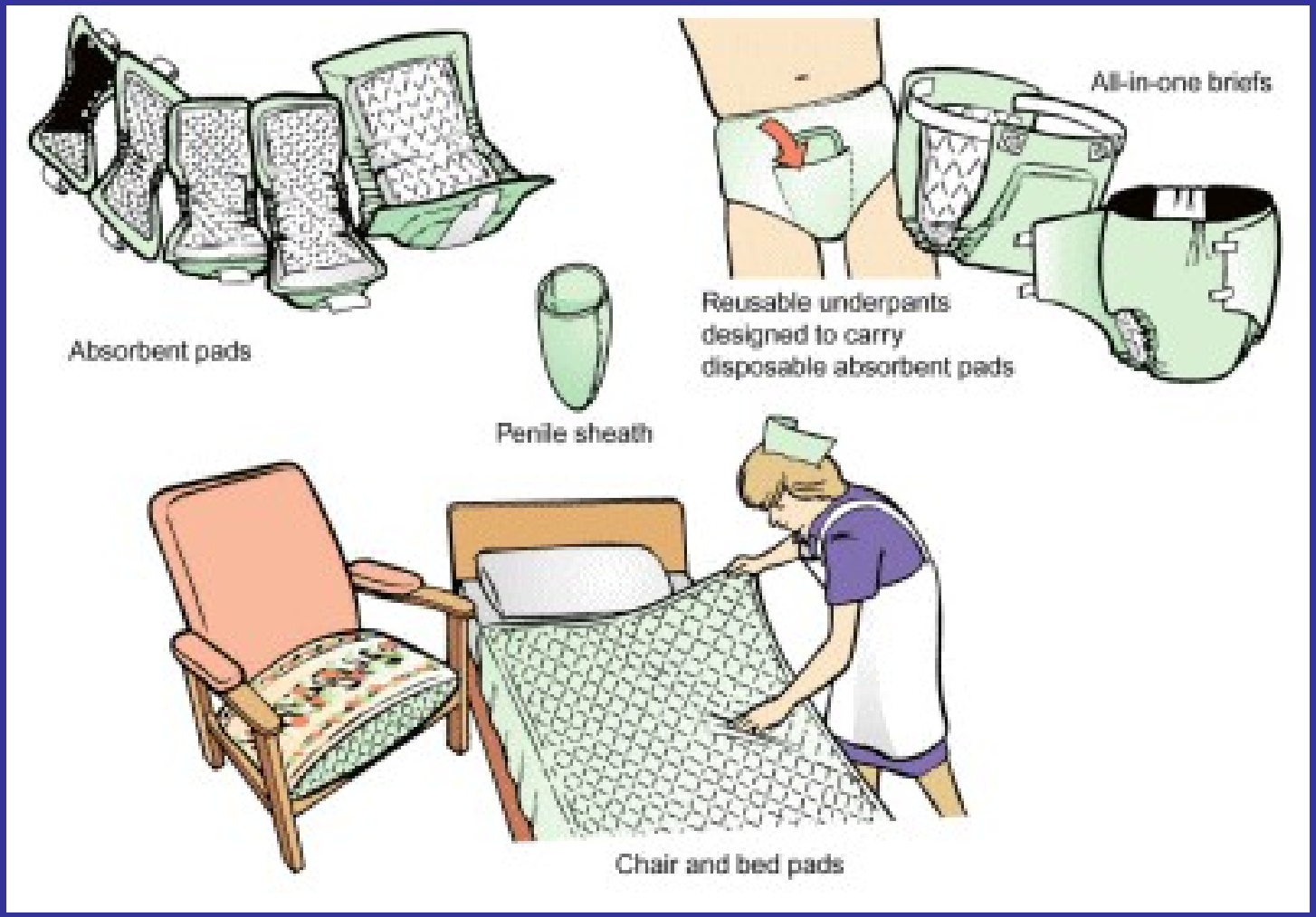
- outpatient procedure
- inject bulking agent into proximal urethra
  (collagen, teflon, deflux, silicone,
  autologous substances: fat, chondrocytes, muscle)
- obtain coaptation of urethra
- may be reabsorbed - incontinence returns
- urinary retention possible complication

Anti-Incontinence Devices

- Intravaginal devices
  - vaginal pessaries
  - bladder neck support prosthesis
- Urethral Occlusion
  - urethral inserts
  - urethral plugs
  - artificial urinary sphincter

Vaginal Pessaries

Absorbent Products



Surgery

- Urge Incontinence (severe)
  - Augmentation cystoplasty
- Stress Incontinence (aim to support neck of bladder and proximal urethra)
  - Burch colposuspension
  - Marshall-Marchetti-Kranz procedure
  - Sling procedures

Nerve Stimulation

- InterStim therapy
  - mild electrical stimulation of sacral nerve
  - implantable device
  - influences bladder, sphincter, and pelvic floor muscles
  - used for urge incontinence, urgency-frequency, and urinary retention

SUMMARY

- Personally devastating and potentially dangerous to patients
- “Don’t ask, Don’t tell” leads to underdiagnosis and missed opportunities
- You can often determine diagnosis *without* or *before* urology referral
- Treatment effective in majority of patients